Space Weather Forecast

Issued on Wednesday, 17 April 2024 at 13:09 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Further Moderate-flares likely and a slight chance of Strong-flares. G1-G2/Minor-Moderate Geomagnetic storming expected at times Day 1, 2 and 4 (17, 18 and 20 Apr).

Solar Activity: Activity is currently Moderate. The largest flare was a Moderate flare at 16/1802 UTC from a small region amongst a cluster of sunspot groups in the southeast disc.

There are fourteen sunspot regions currently visible on the disc. The largest and most magnetically complex region lies in the northeast and provides the bulk of the significant flare risk. The next largest region, located in the northwest, although sizeable, maintains a more magnetically simple appearance. The complex multi spot region in the southeast contains a small group with a mixed polarity spot indicating enhanced magnetic complexity. Remaining regions appear generally more stable with only slow evolution. New regions currently rotating over the eastern horizon appear magnetically simple, but may reveal more complexity as they transit further onto the Earth-facing disc.

A filament (arc of the Sun's material) eruption was observed in the southeast disc starting around 16/1930 UTC. Further imagery is necessary in order to determine if there is any Earth-directed component from the resultant Coronal Mass Ejection (CME).

Another filament eruption was observed around 17/0200 UTC lifting off in the northern hemisphere, although unlikely to have any Earth-directed component as the bulk of material appears to be heading north away from the Earth-Sun line.

Solar Wind / Geomagnetic Activity: Solar wind parameters were indicative of ongoing CME influence during the period. Solar winds were largely slow-ambient, but with a peak of 422km/s (slightly elevated) observed at 16/1546 UTC. The Interplanetary magnetic field (IMF) strength, Bt, was predominantly moderate. The important north-south component, Bz, was moderately negative for large parts of the period. Resultant geomagnetic activity was Kp2 (Quiet) to Kp6 (G2/Moderate Storm).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background with no Solar Radiation Storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity is forecast with occasional Moderate-class flares likely and a slight chance of isolated Strong flares.

Solar Wind / Geomagnetic Activity: Despite background solar wind speeds, current geomagnetic conditions remain enhanced following a Coronal Mass Ejection (CME) arrival late on 15 Apr. This is expected to slowly ease early day 1 (17 Apr) ahead of further CME influence on days 1 and 2 (17 and 18 Apr) given the potential for glancing blows from CMEs that left the

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sun on the 14 and 15 Apr. During day 4 (20 Apr) a solar wind enhancement from a recurrent coronal hole is expected to arrive at Earth, likely increasing speeds to slightly elevated or elevated levels.

Geomagnetic activity is expected to be initially Quiet (Kp1-2), increasing to Active or G1/Minor Storm levels on day 1 (17 Apr), with a chance of G2/Moderate Storms levels at peak. Unsettled to G1/Minor Storm conditions are forecast on day 2 (18 Apr), easing to Quiet to Unsettled on day 3 (19 Apr). On day 4 (20 Apr) Quiet to G1/Minor Storm conditions are expected as HSS from CH25/- arrives at Earth.

Aurora Forecast: Aurora may be visible in the far north of Scotland on Wednesday 17 Apr overnight into Thursday 18 Apr, with a chance that aurora may become visible more widely across Scotland as well as Northern Ireland and parts of northern England. The best chance for clear skies will be across mainland Scotland, Northern Ireland and northern England, although more western areas should see cloud amounts generally increasing through the second half of the night.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to remain at background with no Solar Radiation storms occurring.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	70	50	5	50
Strong	G3	No	10	5	1	5
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	70	70	70	70
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	10
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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